NMR&D News

Naval Medical Research and Development

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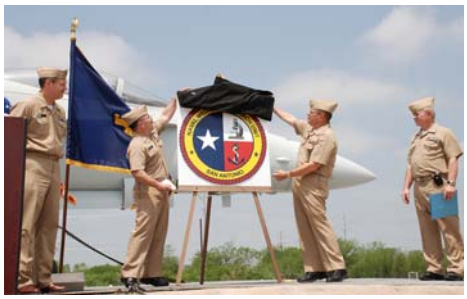
Groundbreaking Ceremony for New Tri-Service Research Laboratory, Establishment of NAMRU-San Antonio

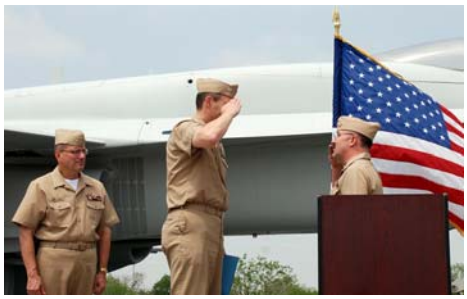
The groundbreaking of the new Tri-Service Research Laboratory and commissioning of the Naval Medical Research Unit-San Antonio (NAMRU-SA) was held May 6 at Fort Sam Houston in San Antonio, Texas. The facility will house the Directed Energy research portion of NAMRU-SA and the Air Force Research Laboratory Directed Energy research group.

During the ceremony, CAPT Vincent DeInnocentiis was sworn in as NAMRU-SA's first commanding officer. NAMRU-SA reports to the Naval Medical Support Center (NMSC) via NMRC. NMSC commander RDML Richard C. Vinci and NMRC commanding officer CAPT J. Christopher Daniel also attended the ceremony. Construction of the new 181,000 square-foot lab will begin in July with an estimated date of completion by March 2011.

Photos by Pamela Henry, Naval Health Research Center Detachment



NAMRU-SA CO CAPT Vincent DeInnocentiis (left) and NMSC Commander RADM Richard C. Vinci unveil the new NAMRU-SA logo



CAPT DeInnocentiis (right) salutes NMRC Commanding Officer CAPT J. Christopher Daniel while RADM Vinci looks on

An artist's rendition of the new TSRL facility at Fort Sam Houston, Texas

Navy Dental Research Looks Toward Future in San Antonio

By Garfield Sicard

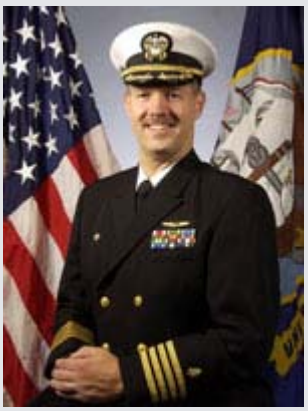
Over the last 62 years, the Navy's dental research efforts have grown from a small unit in Great Lakes, Illinois to become an integral part of Navy Medicine's global laboratory system. The institute now known as the Naval Medical Research Center Detachment-Great Lakes (NMRCD-GL) is developing innovative dental materials, researching ways of preventing dental emergencies, developing methods to prevent infection in maxillofacial implants, and producing a dental diagnostic and treatment CD-ROM for use by independent duty corpsmen.

Dental emergencies experienced in hostile operational settings can jeopardize essential military missions. Research at NMRCD-GL is intended to identify better diagnostic and risk assessment techniques and to develop improved methods of prevention and treatment. Increasing operational readiness, addressing emergent dental problems, enhancing the health care delivery system, and providing data to improve management of the Navy Dental Corps are the intended outcomes of every research project.

NMRCD-GL researchers recently pioneered the use of 3D imaging technologies to guide reconstruction of facial and maxillary bones after traumatic injury. Also, a novel antibiotic delivery system was developed using nanoparticles incorporated into cranial implants prior to surgery to reduce the incidence of post-surgical infections. This project won the first place award for posters at the Hines VA Medical Center in Chicago in May 2009.

Today, NMRCD-GL researchers are focusing on oral biology, epidemiology, and materials science to develop products that will improve military readiness. This critical research will continue when NMRCD-GL relocates to San Antonio, Texas to become part of the Navy Medical Research Unit-San Antonio (NAMRU-SA). NMRCD-GL continues to conduct scientific investigations that provide the most responsive and most cost-efficient methods of addressing the research-related dental issues of the Navy.

Commanding Officer's Message



Men and Women of Naval Medical Research & Development (NMR&D):

You are now reading the inaugural issue of our new, yet-to-be-named newsletter. As one of over 1500 valued staff members of our global research enterprise, each of you plays a critical role in our efforts to improve the health, safety, readiness and performance of those who wear the cloth of our Nation and their families. Moreover, much of what we do also provides great benefit to our fellow citizens in the United States, Egypt, Peru, Indonesia, Cambodia, Ghana and indeed throughout the world. It is gratifying to be able to dedicate our efforts to such a noble mission, and it is especially gratifying for me to have had the opportunity to serve you as the Commanding Officer of NMRC and as the Director of our NMR&D Enterprise. As I have met with you during these past three years, I have frequently spoken of the larger family of our staff around the world, but I realize that for the most part, you are only aware of what goes in your own lab. I am hoping that this new newsletter will be the vehicle to bring us all together, to allow those of you in Cambodia to learn more about what is going on in San Antonio, those of you in Groton to learn more about what is going on in Cairo, and so on. Each issue will have a mix of stories about our fantastic people and your amazing accomplishments. I hope you like it! Please let us know what you think, send us material for future editions, and tell us what you think we should call it - so far our options include "NMR&D News" (our temporary name), "Research Roundup," "Research Endeavors," and "Enterprise Reporter," but we are certainly open to other ideas.

Again, thanks for the great work you do every day!

v/r
CAPT Chris Daniel

Navy Medical Research and Development Responds to H1N1

The **Naval Health Research Center** (NHRC) played a critical role in detecting the first US cases of H1N1 influenza. NHRC's Department of Respiratory Diseases Research serves as the Navy hub for respiratory disease surveillance. The department's surveillance activities cover three fleets, overseas settings, populations located on the border with Mexico, and recruit training among all military services. Because these activities were in place, NHRC was prepared when the swine influenza epidemic began. NHRC's first two cases involved children of 9 and 10 years old. Two specimens from the first child suggested an influenza A but subtype negative virus. The specimen and an isolated virus were then sent to the Centers for Disease Control and Prevention (CDC) for confirmation. Initial testing on the second child also demonstrated an influenza A/untyped virus; further testing suggested an influenza A/swine/H1 virus. This was around the time the CDC notified NHRC that the virus infecting the first child was an influenza A/swine/H1N1. The CDC later confirmed H1N1 in the second child. Since April 20, NHRC has analyzed specimens from over 2,700 individuals and identified H1N1 infection in over 350 cases.

In May, **U.S. Naval Medical Research Unit No. 3** (NAMRU-3), Cairo, Egypt deployed H1N1 rapid response teams to the Eastern Mediterranean, West African and Central Asian regions to identify H1N1 cases as they arrived and to ensure measures were in place for a response. NAMRU-3 worked with the World Health Organization and the CDC to train over 110 laboratory technicians from 30 host nations. Training was conducted on real-time diagnostic capability using polymerase chain reaction (PCR). The unit provided initial supplies for diagnosis and coordinated distribution of CDC H1N1 kits to the countries in these regions. As a result of NAMRU-3's rapid support, three countries have already been able to document and respond to H1N1.

The **Naval Medical Research Center Detachment** (NMRCD), Lima, Peru has 52 laboratory-based influenza surveillance sites throughout South and Central America. Following the H1N1 outbreak, NMRCD personnel met with the Peruvian Ministry of Health to assist in coordinating their surveillance response. The detachment agreed to provide bilingual epidemiologists to support airport surveillance and also provided over 3,000 rapid influenza test kits to the Ministry of Health for distribution to regional health centers and provided the Peruvian National Institutes of Health with primer-probes for real-time PCR and universal influenza primers for standard PCR for influenza testing. Due in no small part to NMRCD's support, Peru has identified 141 cases of H1N1 influenza.

On May 6, the **Naval Medical Research Center** (NMRC) entered into a Cooperative Research and Development Agreement with Vical Incorporated for expedited development of a vaccine against the potentially pandemic H1N1 influenza virus. The goal of the collaborative development program is to advance a Vaxfectin®-formulated H1N1 DNA vaccine into clinical testing as quickly as possible. Vical would be responsible for commercialization of the vaccine. Vical's technology is well-suited to emerging infectious diseases like H1N1 for which conventional vaccine technologies are too slow in both development and manufacturing.

NMRC Begins Two New Malaria Preventive Vaccine Trials

By CAPT Judith Epstein, M.D.

Investigators in the U.S. Military Malaria Vaccine Program launched two "first in humans" malaria vaccine trials in May. Both trials will test the vaccines' safety, tolerability, immunogenicity and how they protect people against malaria infection.

The first trial is called "DNA-Ad" because it involves a new malaria DNA vaccine and an adenovirus vaccine. Both vaccines are designed to induce immune responses targeting the liver and blood stages of the malaria life cycle. Studies have shown that more than one type of vaccine given in sequence will greatly increase the vaccine's effect relative to either vaccine given alone. This vaccine regimen consists of three doses of DNA vaccine given at monthly intervals followed by one dose of adenovirus vaccine four months after the last dose of DNA vaccine and with malaria challenge four weeks later. The first dose of this DNA-Ad combination was administered on May 12 and 13 to 20 healthy malaria naïve volunteers.

Challenge is scheduled to occur in the last week of November. The results on protective efficacy are anticipated to be available in December 2009.

The second candidate malaria vaccine, the PfSPZ Vaccine (*Plasmodium falciparum* Sporozoite Vaccine), is based on human studies in which volunteers exposed to the bites of mosquitoes infected with irradiated *Plasmodium falciparum* sporozoites developed protection against *P. falciparum* sporozoite challenge. The sponsor of the trial, Sanaria, has developed a metabolically active radiation-attenuated *P. falciparum* sporozoite vaccine that meets FDA criteria and can be delivered by needle and syringe.

The first immunizations of the new PfSPZ Vaccine occurred on May 25 and 26. Eighty volunteers will receive four vaccine doses at one-month intervals. Three weeks after the last dose, the immunized volunteers and six unimmunized control volunteers will be challenged by the bites of mosquitoes infected with *P. falciparum*. Volunteers will be monitored closely and treated immediately with chloroquine if they develop infection. Immunized volunteers who do not develop infection will be assumed to be protected. Results on protective efficacy should be available by Thanksgiving 2009.

Photos by Mass Communication Specialist Seaman Timothy H. Wilson

NMRC Scientist is Service to America Medal Finalist

Dr. Patricia Guerry, Chief, Molecular Biology and Biochemistry Branch, is a finalist for the Partnership for Public Service 2009 Service to America Medal in acknowledgment of her work to develop a Campylobacter vaccine. The Service to America Medals are presented annually by the nonprofit, nonpartisan Partnership for Public Service celebrating excellence in federal civil service. This medal is accompanied by a $3,000 award.

Food-borne illness strikes more than 76 million Americans a year and hundreds of millions worldwide, and its most common cause in the United States is the Campylobacter microbe. Dr. Guerry has invented a new vaccine against Campylobacter that has worked spectacularly in early trials and may be only a couple of years away from human trials. Dr. Guerry's vaccine could have major implications in alleviating suffering for our troops, who are particularly vulnerable to food poisoning. But the potential benefits are even greater in poorer nations, where the Campylobacter microbe can be fatal.

After decades of study, Dr. Guerry and her team, working with Canadian chemist Mario Monteiro, have advanced a vaccine through a series of tests that culminated in a definitive monkey trial in 2008. The vaccinated animals were completely protected from intestinal disease when challenged with this debilitating microbe.

Dr. Guerry has already marshaled the resources for human trials to commence in the next few years. "I've been given a two-year grant from National Institutes of Health to make this vaccine human testable," she said.

"She is the number one researcher on campylobacter in the United States, if not the world," said Dr. Alison O'Brien, President of the American Society for Microbiology.

"In solving the problem for the military, she is also helping Third World nations as Campylobacter is a leading cause of food-borne illness in children in underdeveloped countries," said Captain Chris Daniel, the commanding officer of Guerry's lab at the Naval Medical Research Center.

For more information on Dr. Guerry's achievements, visit the Service to America website at http://servicetoamericamedals.org/SAM/finalists09/stm/guerry.shtml.

Please join us in congratulating Dr. Guerry!

Focus on the Labs - NHRC

"Echoes" - Past Trauma to Present Life

By Dr. Jerry Larson

Many military personnel view combat-related anxiety or mood disorders as a sign of personal weakness and believe their peers and leaders would lose confidence in them if they were to seek help. Surveys of military personnel consistently show high levels of embarrassment surrounding mental health. As a result, service members may deliberately avoid getting the mental health support they need. In response to concern about psychological health problems in returning combat veterans, the military has implemented combat and operational stress control programs to educate service members about the signs of combat stress and resources available for stress management.

Dr. Jerry Larson and Dr. Heidi Kraft of the Naval Health Research Center (NHRC) Behavioral Science and Epidemiology Department created an educational video portraying a Marine combat veteran and his struggles with combat stress. They felt it was important to show how untreated symptoms of combat stress can interfere with family life, believing that service members would be willing to seek help for their families' sake even if they were inclined to avoid seeking care for their own sake. Moreover, Dr. Larson and Dr. Kraft wanted to embed the message, consistent with Marine Corps doctrine, that combat stress can be viewed as an injury analogous to physical wounds sustained on the battlefield.

The video is entitled "Echoes" to signify the spillage of past trauma into present life. The protagonist is a Marine Corps combat veteran who is agitated by abrupt noises and violent scenes at a carnival and video arcade and for whom a roller coaster ride triggers a painful memory of a bloody engagement in Iraq. The Marine is clearly suffering from survivor's guilt related to the death of one of his squad members. After leaving the carnival, the Marine's wife expresses concern about her husband's distress and his denial that anything is wrong. Talking honestly together about his state of mind, perhaps for the first time, they conclude that it is time for him to seek help. At the conclusion of the film, U.S. Marine Sgt. James "Eddie" Wright, a decorated Operation Iraqi Freedom veteran and multiple amputee, delivers an on-camera message that stress-related injuries are not a sign of weakness and that they are treatable.

Resources to develop this video became available through the support of Rep. Susan Davis, D-CA. To produce the video, NHRC and Science Applications International Corporation (SAIC) partnered with Strategic Operations/Stu Segall Productions, an organization that combines high-quality film production with realistic Iraqi villages used for Marine Corps training. By leveraging use of the existing sets and the established relationship between the studio and the Marines, it was possible to produce realistic and credible combat reenactments at a relatively low cost.

Since "Echoes" was first circulated in April, Navy leadership has enthusiastically embraced the video as an important and timely message. The Vice Chief of Naval Operations has directed that "Echoes" be widely distributed, and the video is now viewable at many Navy websites, including the Navy's Lifelines website, http://www.lifelines.navy.mil/lifelines/video-straining/index.htm.

The Bureau of Medicine and Surgery has asked NHRC to develop additional combat stress videos. The Behavioral Science and Epidemiology Department will soon begin an Army-funded project to develop broad stigma reduction programs for both the Army and the Marine Corps.

Kidney Transplant Program in Guyana

By CDR Eric Elster, M.D.

In May, a team of U.S. physicians and nurses from the Army/Navy Transplant Service at Walter Reed Army Medical Center (WRAMC) performed the third and fourth kidney transplants at Georgetown Hospital in Guyana. The team consisted of Dr. Rhaul Jindal, M.D., transplant surgeon, WRAMC; CDR Eric Elster, M.D., transplant surgeon, NMRC; LTC Arthur Womble, CRNA, U.S. Army Reserve; and Mrs. Tara Farley, OR nurse, WRAMC. Dr. Jindal arranged and led this mission to provide this much-needed service in Guyana. Prior to developing the capability for kidney transplantation in Guyana, renal patients had limited options, as hemodialysis is only offered for short periods of time and renal transplant was unaffordable for most of the population. With the full support of the local Ministry of Health and the Georgetown Hospital, Dr. Jindal and LTC Edward Falta previously performed the first two renal transplants on two separate trips.

Prior to the transplants, the previous two recipients were seen in clinic and future donor and recipient pairs were screened. The donor nephrectomies and renal transplants were carried out uneventfully with support from a local urologist. ICU care was directed by Drs. Jindal and Elster during the immediate post-transplant period. The visit ended with dinner with Dr. Leslie Ramsammy, Minister of Health, where capacity-building approaches such as this effort were discussed.

Strategies for Treatment of Hemorrhagic Shock

By CDR Eric Elster, M.D. and Dr. Doug Tadaki, Ph.D.

Traumatic blood loss due to combat-related injuries is the primary cause of death in field combatants. If the warfighter survives the initial blood loss, administration of resuscitative fluids can lead to hemorrhagic shock and death. Researchers in NMRC's Regenerative Medicine Department hypothesized that effective, field deployable life-saving therapeutics could be based on a focused modulation of the immune system processes that could interrupt the pathophysiological cascade leading to hemorrhagic shock.

The objective was to determine whether drugs that cause lymphocyte depletion or sequestration (removal from the circulation) administered at the time of severe hemorrhage can prevent the inflammatory response to ischemic injury and hemorrhagic shock. To determine the efficacy of this approach, a large animal (pigs) model was treated with anti-lymphocyte antibody (porcine anti-thymocyte globulin) that deleted the lymphocytes from the animals' immune system. The researchers also used the same animal model to evaluate FTY720, a novel lymphocyte sequestering agent manufactured by Novartis Inc. FTY720 causes the lymphocytes to collect in the lymph nodes, leaving them unavailable for the animals' systemic response. As FTY720 allows for the rapid sequestering of lymphocytes after administration and repopulation of lymphocytes soon after discontinuing use, it is ideally suited for far-forward trauma care .

This study demonstrated that modulation of the immune response either by depletion or sequestration of the immune cells decreased hemorrhage-induced mortality from 80 percent in the controls to 20 percent in the treated animals. The Regenerative Medicine Department is in discussions to secure funding for a Phase I/II clinical study for use of thymoglobulin for treating trauma patients and anticipates that lymphocyte modulating agents will be the basis for an improved field treatment of combat-injured warfighters.

ISI - Coming Soon

By Soni Fitzhugh

Navy Medicine has purchased access to the "Web of Science," an online academic database provided by Thomson Scientific's Institute for Scientific Information (ISI). The Web of Science includes indices of citations related to science, social science and conference proceedings. The databases cover almost 10,000 leading journals and over 100,000 book-based and journal conference proceedings. Users can search the databases by topic, author, group, publication year, source title or address. The citation indices contain references that have been cited by other articles. Such citations can be used to locate articles that cite an earlier publication.

Also coming is "EndNote Web," a tool for managing and citing references in papers and creating bibliographies, saving countless hours of typing and interpreting style requirements when creating bibliographies. You can reach the Web of Science and Endnote Web at www.isiknowledge.com.

NMRC/WRAIR Sponsor 2009 Asian Pacific Heritage Celebration

By LTJG Amanda Gardner

The Naval Medical Research Center/Walter Reed Army Institute of Research Asian Pacific Heritage Celebration, held on May 29, was a true success. NMRC Executive Officer CAPT Eileen Villasante opened the celebration, after which Kalpana Parekh, Savita Nigam, Nisha Mishra and Sanghamitra Mukhopadhyay performed an Indian folk song. Members of NMRC and WRAIR ruled the runway for an Asian Pacific multicultural fashion show as CDR Charmagne Beckett described the cultural significance of the attire. Subhamoy Pal followed with an Indian instrumental performance. Guests then enjoyed Nisha Mishra's performance of an Indian dance from Bhul-Bhulaiya, after which Sameet Ashfaq performed a Pakistani dance and Sanghamitra Mukhopadhyay, performing as Jai Ho from the movie "Slumdog Millionaire," led the crowd in a Bollywood dance.

Then it was time to enjoy the cuisine prepared by country exhibitors from India, Philippines, Taiwan, Thailand, China, South Korea and Indonesia. While indulging in the tasty dishes, guests participated in a geography quiz, had their names written in Chinese calligraphy, and observed a paper artist making delicate roses. In fierce competition, the host exhibitors showcased their artifacts and food. The first

place winner was Indonesia, followed by second place Taiwan and third place Philippines. The judges were WRAIR Deputy Commander COL D. Grey Heppner and CAPT Eileen Villasante.

The Multi-Cultural Committee would like to thank all the participants and exhibitors for making the 2009 Asian Pacific Heritage Celebration a moving experience for everyone. Our next celebration will be for Hispanic Heritage month in October. We look forward to putting on many more spectacular events to celebrate and learn about the many cultures around the world.

Photos by Dave Miles

News from the Laboratories

NAMRL Embraces Lean Six Sigma, Prepares for BRAC Transition

By CDR Rita Simmons
Officer in Charge, NAMRL

This spotlight on NAMRL will serve to highlight the impressive productivity that our team of researchers has recently achieved and provide an update on the approaching BRAC transition to Wright Patterson Air Force Base. NAMRL has fully embraced Lean Six Sigma principles to accomplish significant improvements in business methodology with the goal of decreasing the time from bench to battlefield without compromising quality. Our researchers have put this new philosophy into practice and are delivering more products per $100,000 of funding than at any time in the lab's recent history. Productivity is defined as published articles and technical reports, delivered technology, research-based formal recommendations on standards or policy and other pre-identified deliverables. An example from a recent NAMRL Return on Investment assessment, including FY05-FY09 (mid-year), showed that FY05 had more than double the funding compared to FY08 and FY09, with only one product delivered. In contrast, 18 products were delivered in FY08, and for FY09 through mid-year, 19 products have been approved for publication. These facts speak to the effectiveness of process improvement and product focus in NAMRL research.

As we consider the BRAC transition to Wright Patterson Air Force Base (WPAFB), the renewed focus on productivity, quality and collaboration will ensure sustainment of the mission. Although the move does not begin until FY11, NAMRL, soon to be the Naval Medical Research Unit-Dayton, has already begun the work of laying scientific bridges. NAMRL leadership and scientists are determined to remain fully operational during the move and are confident it can be accomplished by teaming with our research allies in Pensacola, Dayton and beyond. We look forward to our partnership with the Air Force as we create the new Aeromedical Center of Excellence and solidify our laboratories' role as the leaders in aviation research for the Navy, Marine Corps and Department of Defense at WPAFB.

The current NAMRL facility at Naval Air Station, Pensacola, Florida

Congratulations!

To **HM1 Judith Gigremosa** on earning a Masters of Science in Health Care Management from TUI University, graduating Magna Cum Laude.

To **CDR Trupti Brahmbhatt** on her promotion to Commander on June 17.

To **CDRs John Sanders** and **Richard Mahon** on their selection for promotion to Captain by the Fiscal Year 2010 Promotion Board.

Promotions

Congratulations to Petty Officers Tashia Blue, Stephen Petzinger and Timothy Velasco, who advanced from HM3 to HM2 at a frocking ceremony held on June 1. Pictured from left to right: HM2 Blue, CAPT Daniel, HM2 Petzinger and HM2 (SW) Velasco.
Photo by Dave Miles

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